TEAM: 938D

Building Robots and Solving Problems: A Data Science Career through VEX Robotics

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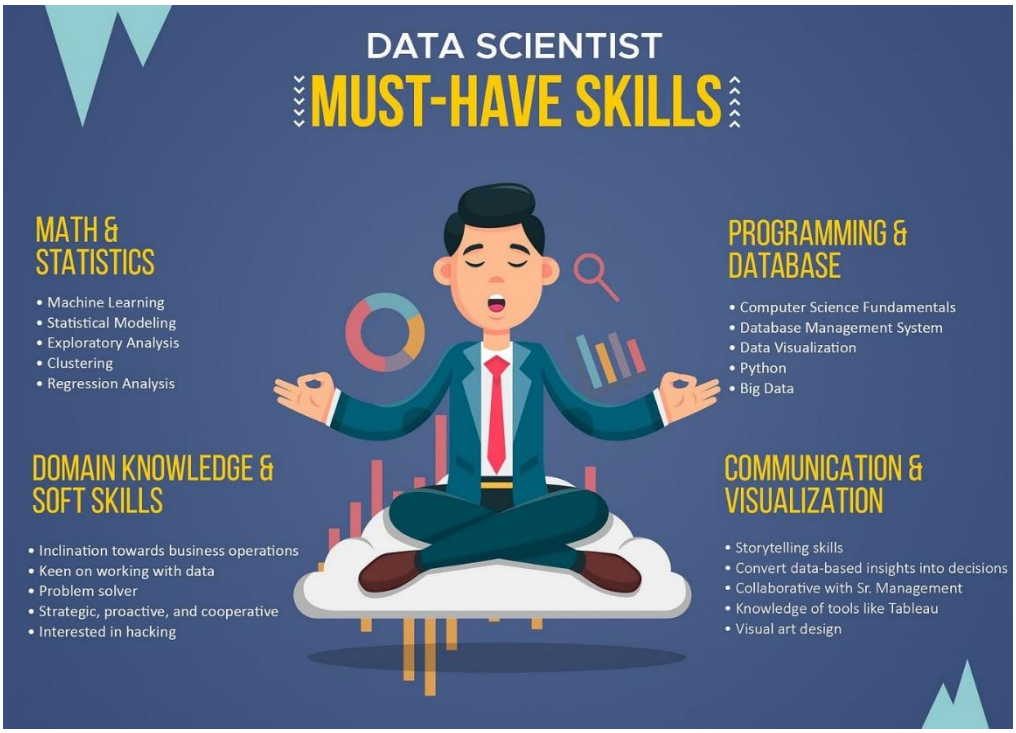
INTRODUCTION: DISCOVERING THE PATH TO A DATA SCIENTIST CAREER

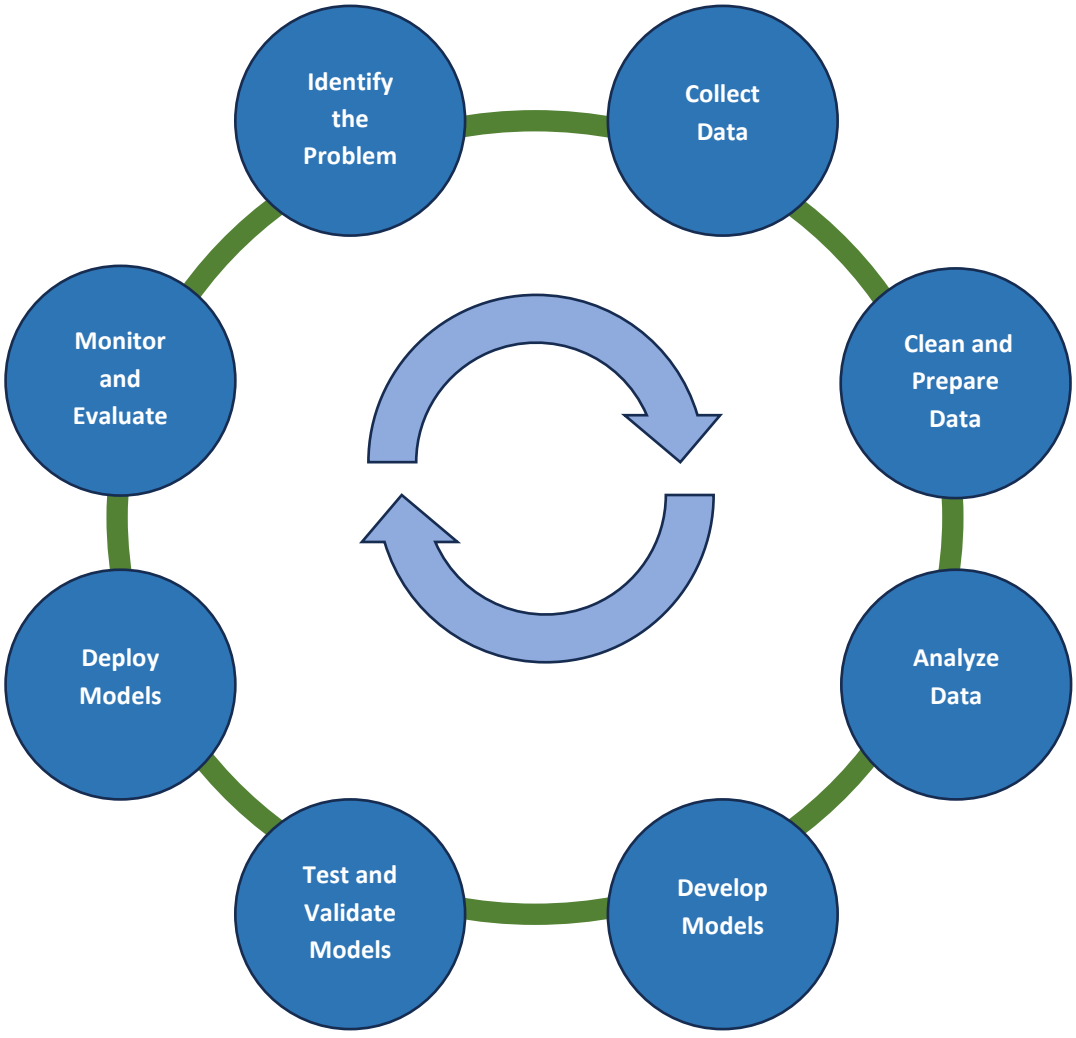
In this time of computers and the internet, data science is a powerful tool that helps many people come up with new ideas. We really enjoy working in VEX Robotics and were excited to learn more about how it connects with data science. We chose the STEM profession of Data Scientists because we all have an interest in how things work, and we enjoy problem solving. We thought it would be interesting to learn more about data scientists and how they use math and computers to solve problems. We gathered information about data scientists from books, websites, and interviews with data scientists and here we will tell the story of how it will help us get ready for the job.



EXPLORING THE WORLD OF DATA SCIENCE: HOW TO USE COMPUTERS AND THE INTERNET TO FIND NEW IDEAS

Data Science is all about using computers to find new ideas and solve problems. It's like a big puzzle, where we must put together lots of different pieces of information. It helps people make good decisions in many different jobs. It is important to be good at math and know how to use computers to be a data scientist. Data scientists use the following steps to solve problems:

1. **Identify the Problem**
   Gather information and data to understand the problem in detail.
2. **Collect Data**
   Data collection can be done through surveys, experiments, and observations.
3. **Clean and Prepare Data**
   Organize data to remove errors and inconsistencies.
4. **Analyze Data**
   Apply statistical and mathematical methods to data to identify patterns and trends.
5. **Develop Models**
   Create models to predict future outcomes based on data analysis.
6. **Test and Validate Models**
   Test models on new data to ensure they are accurate and reliable.
7. **Deploy Models**
   Use models to make predictions and inform decisions.



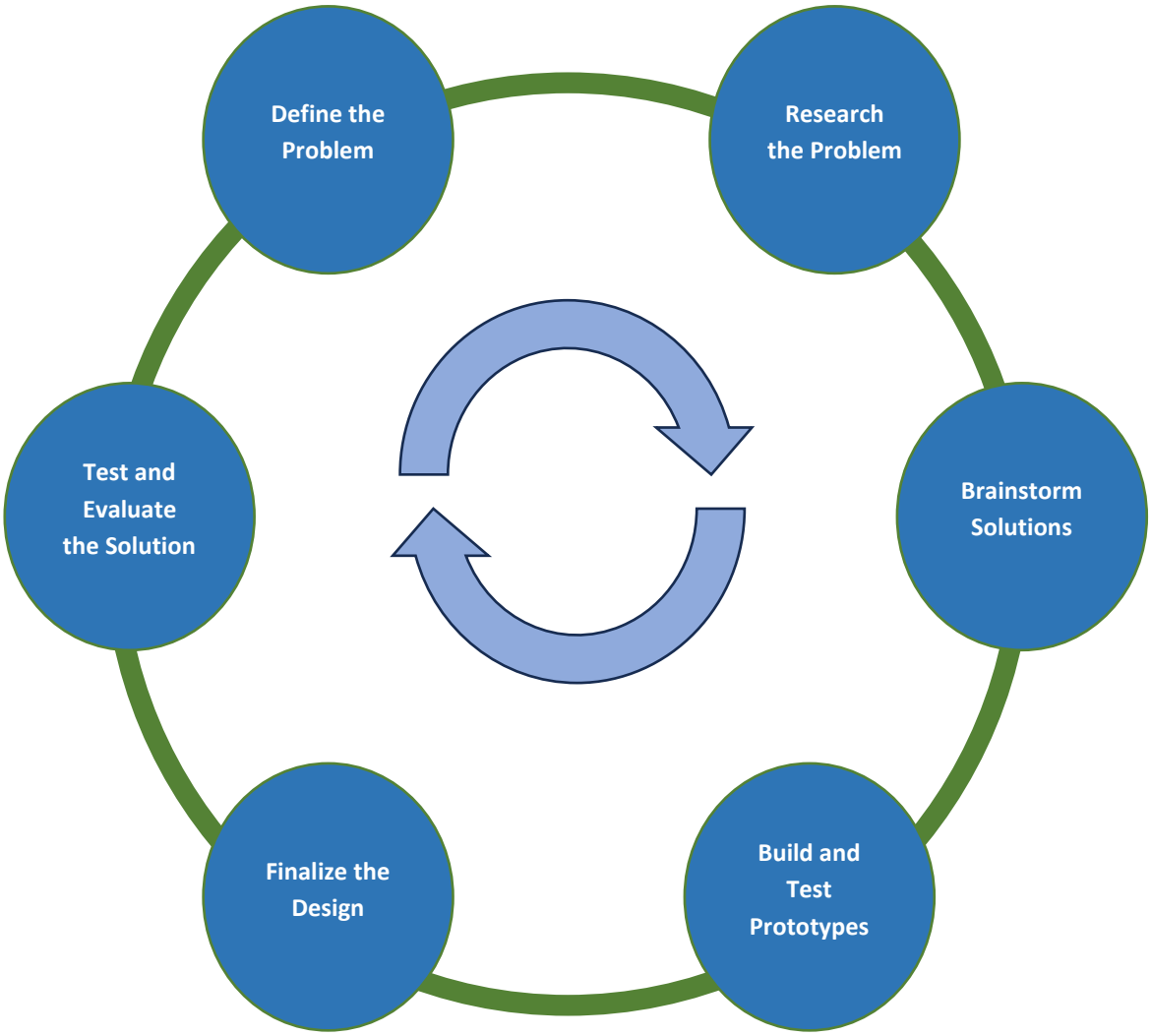
8. **Monitor and Evaluate Models**
   Continuously monitor models to ensure they are performing as expected and improve as needed.

THE VEX ROBOTICS ENGINEERING DESIGN PROCESS: HOW VEX ROBOTICS ENGINEERING HELPS US THINK CAREFULLY

VEX Robotics Engineering is all about building robots and solving problems. Like Data science, it is also a big puzzle, where we have to put together different pieces of information. When we build robots, we use a special process to make sure we are doing it the right way. This process helps us solve problems step by step. We start by figuring out what the problem is and then come up with lots of different ideas to solve it. We try out each idea and see what works best. Finally, we build our robot and test it to make sure it works well. This process helps us be good at solving problems and paying attention to details.

We used the following engineering design process to build a robot that could solve a problem:

1. **Define the Problem**
   Our team's challenge was to design and build a robot that could navigate a course, pick up objects, and deliver them to a goal.
2. **Research the Problem**
   We researched different types of robots, sensors, and programming languages that could be used to solve the problem.
3. **Brainstorm Solutions**
   We brainstormed different ideas for how to design and build robots.
4. **Build and Test Prototypes**
   We built and tested several times to determine the best design.
5. **Finalize the Design**
   We finalized the design of the robot and built a final version.



6. **Test and Evaluate the Solution**
   We tested the final version of the robot to ensure that it could successfully solve the problem.

TRANSFERABLE SKILLS: FROM ROBOTICS TO DATA SCIENCE

As you can see in the two circle figures, the engineering design process is like the data science process in that both processes involve gathering information, analyzing data, developing solutions, and improving them. The main difference between the two processes is that data scientists use math and computers to solve problems, while robotics engineers use physical materials.

Following are the main skills we learnt in VEX Robotics which are transferable to a Data Scientist career:

Thinking and Problem Solving

When we were in the VEX Robotics competition, we had to be creative and solve problems. We learned how to break down big problems into smaller ones, so we could solve them one by one.

Programming and Coding Skills

In VEX Robotics, we learned how to code the robot brain and use programs to control it. These skills are important for data science, where people use computers to find new ideas. We learned how to use programming languages which are also important for data science.

Teamwork

In VEX Robotics, we worked in a team of people who were all different. We learned how to work together to solve problems. This is important for data science too because people often work together to find new ideas.

VEX Robotics has taught us how to use the engineering design process to solve problems. We have also learned how to work as a team, how to communicate effectively, and how to persevere when faced with challenges. These are all valuable skills that we will use in our future careers as data scientists.

CONCLUSION: LOOKING AHEAD TOWARDS A DATA SCIENCE CAREER

We love building robots and solving problems. We use the Engineering Design Process for solving problems to make sure we're doing it the right way. This process helps us solve problems step by step. while paying attention to details. What we have learnt during this process in VEX Robotics will help us if we choose Data Scientist as the career as some of the learning skills are same in both and hence, we can apply the same insights.

We would like to thank our mentors, parents, and teachers for supporting us on our journey in VEX Robotics. We would also like to thank the VEX Robotics Competition for providing us with the opportunity to learn and grow as engineers and scientists.

938D Engineering Notebook

Digital Dragons

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